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A DISEASE OF CAULIFLOWER AND CABBAGE CAUSED BY
SCLEROTINIA.

BY GEORGE GRANT HEDGCOCK.

The cabbage, cauliflower, and related plants are more often diseased by the black rot due to *Pseudomonas campestris* (Pammel) Smith than by all other causes combined. During the past two years plants of both cauliflower and cabbage have been observed at the Missouri Botanical Garden and elsewhere in the vicinity, decaying with a dark rot, often accompanied by numerous tiny black specks. This at first was thought to be a form of the bacterial rot. When specific cases on the cauliflower were brought to our immediate attention, the differences between this disease and the bacterial one were noted. Cultures carefully taken from the interior of decaying cauliflower stems, quite uniformly produced colonies of a fungus with a white, fluffy mycelium. These were transferred and the fungus studied throughout all its stages and identified as *Sclerotinia Libertiana* Fckl. It has been grown under careful bacteriological methods, and inoculations have been made, the results of which verify its nature as a parasite, and also confirm the investigations of Ralph E. Smith on *Botrytis* and *Sclerotinia*.*

The rot of cauliflower produced by *Sclerotinia Libertiana* is more watery than that caused by *Pseudomonas campestris*, and the diseased tissues are not so dark in color. Sclerotia are not always present, and when found are usually sparse in number. The fungus penetrates through the cell walls of the host in every direction, causing a collapse of the cell walls, and wherever the epidermis becomes ruptured a rapid escape of the protoplasm of the

* Bot. Gaz. 29: 369-406. (Jun. 30, 1900).

decomposed tissues takes place. The collapse is apparently hastened by a dissolution of the cellulose walls by an enzym secreted by the fungus. The younger, growing portions of the plant are favorite places for attack. The petioles of the leaves are often rotted away at the base, the leaves droop, and the fungus grows down through each leaf, rotting it, often forming sclerotia on the thinner portions. Sometimes older cauliflower plants are attacked at the base and rotted off, before the head becomes diseased.

Pure cultures of the fungus were obtained from the cauliflower in February, 1904, and grown in potato, rice and agar tubes. These all formed prominent sclerotia in a few weeks, only a few being produced in each tube. At the same time cultures of *Botrytis cinerea* Pers. were obtained from a number of sources, and grown for comparison. These bore numerous smaller sclerotia. Sclerotia from old, dry cultures of both species were placed in pots of soil, previously sterilized in an autoclave at 15 pounds pressure for three hours. They were barely covered with the soil and placed in a moist room, and kept in moist soil for about three months. In seven weeks the *Sclerotinia* sclerotia threw out from each a number of brown or gray stalks, and in a week or two more, apothecia developed upon the stalks. These at first were trumpet shaped with a convex cup, but flattened out and became concave when mature. In color they were a light brown.

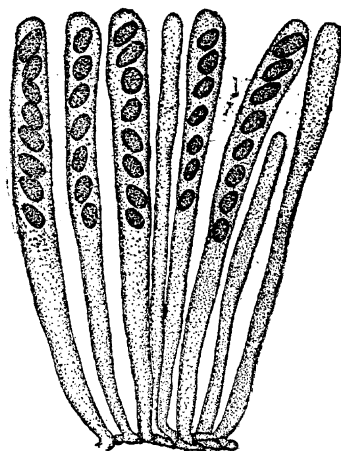
The apothecia contained eight-spored asci. The ascospores were slightly granular, but without guttules. In poured agar plates they germinated readily and developed rapidly into dense white fluffy colonies. The mycelium was destitute of conidia at every stage. In less than two weeks sclerotia were formed on colonies transferred to potato or rice tubes. Inoculations with both the ascospores from the apothecia and the mycelium from pure cultures produced the typical rot of the cauliflower, control plants

wounded but not inoculated remaining free from the disease. The fungus was again isolated from the inoculated plants and grown in pure cultures with the same results as in the former instance.

Sclerotinia sclerotia, after remaining dry for over a year, threw out filaments, developed an extensive mycelium, and formed new sclerotia in less than two weeks from the date they were placed in fresh potato tubes. This indicates the great vitality of the fungus while in this stage.

Fewer cultures of *Botrytis* were used than of *Sclerotinia* in the parallel experiments, but later over 200 cultures of *Botrytis* have been grown and a large number of *Botrytis* sclerotia placed in pots of sterile soil. No apothecia have developed from this latter experiment, which is still in progress at the time of writing.

MISSISSIPPI VALLEY LABORATORY.



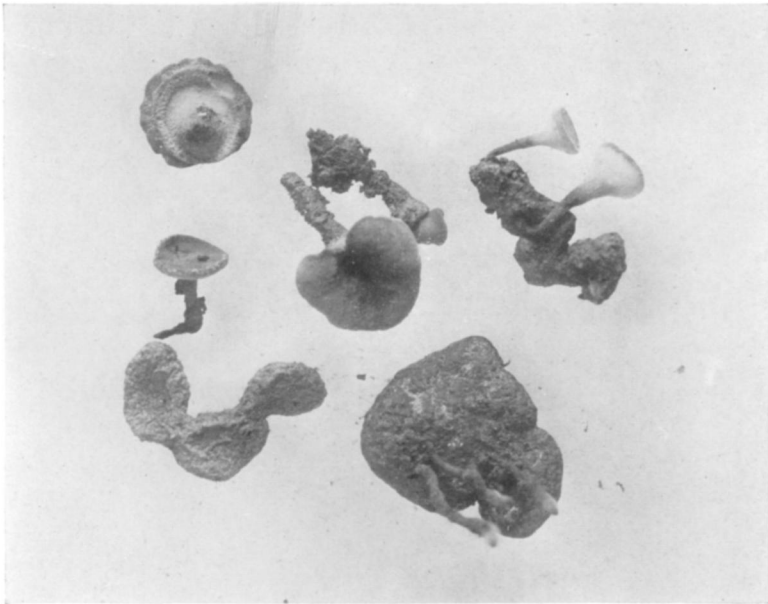
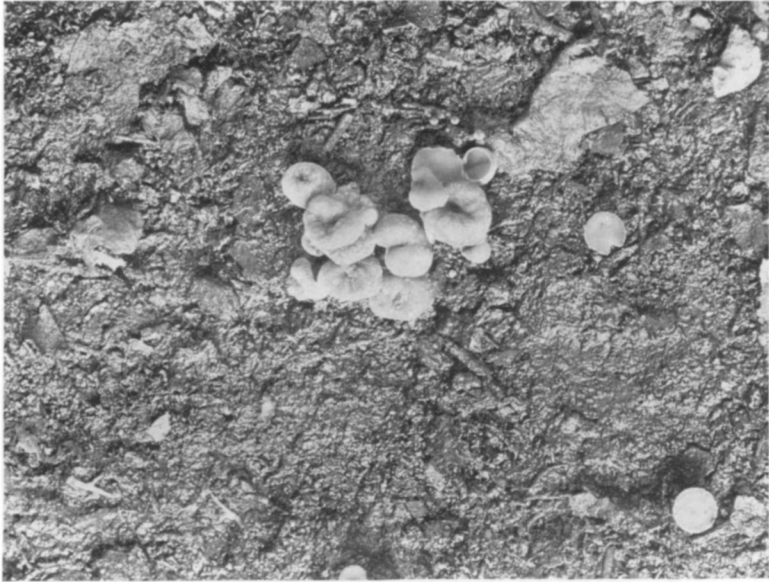
SCLEROTINIA ASCI.

EXPLANATION OF PLATES.

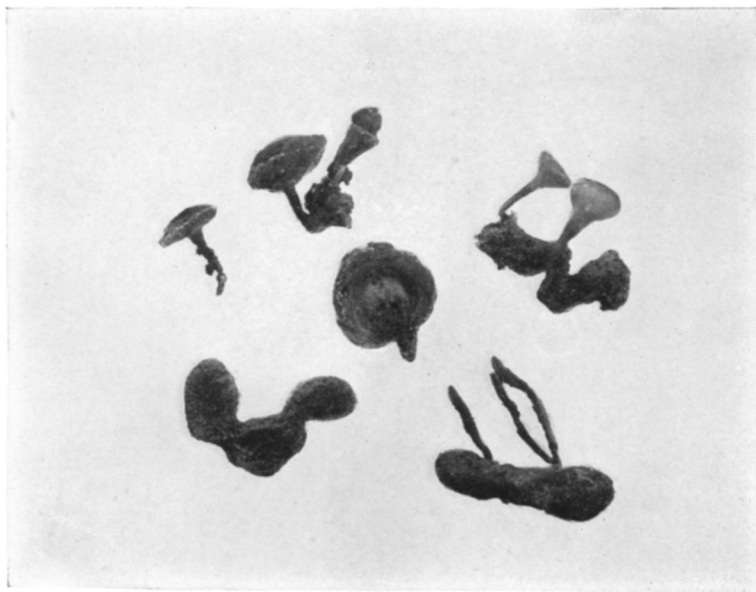
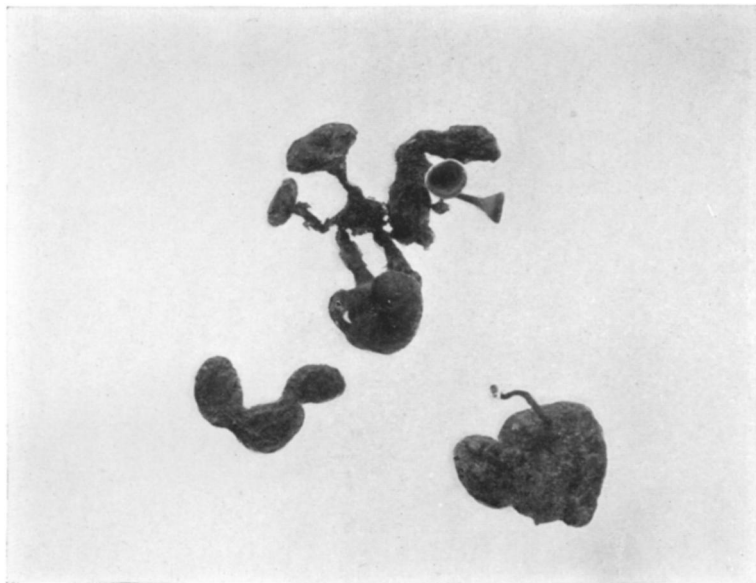
Plate 32. — *Sclerotinia Libertiana*. 1, Upper view of a group of apothecia, most of which are mature. 2, Sclerotia with apothecia developing.

Plate 33. — *Sclerotinia Libertiana*. 1, 2, Sclerotia before, during, and after the development of apothecia.

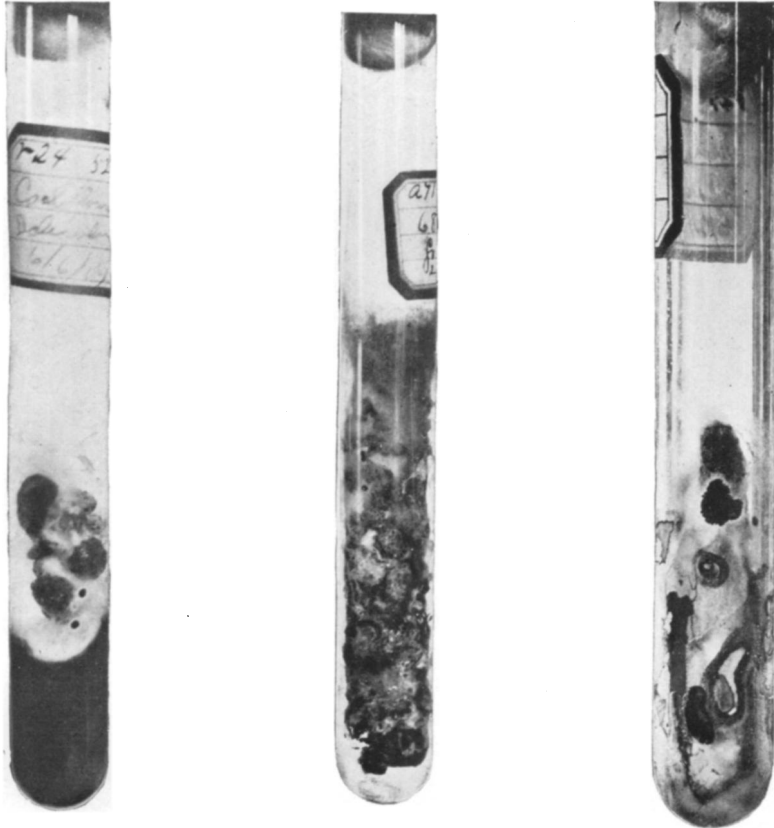
Plate 34. — *Sclerotinia Libertiana*. Pure cultures on agar slant tubes. The dark bodies are sclerotia.



SCLEROTINIA OF CAULIFLOWER.



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